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AN OBJECTIVE EVALUATION OF ATTITUDE CHANGE IN TRAINING, A\
BEFORE AND AFTER STUDY OF 12 STIMULI IN A SUPERVISORY
PROGRAM. PAPER PRESENTED AT THE NATIONAL SEMINAR ON ADULT
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DIFFERENTIAL,

DESIGNED TO DETERMINE WHETHER CHANGES IN ATTITUDE OCCURRED AS A RESULT OF PARTICIPATION IN AN INDUSTRIAL SUPERVISORY TRAINING PROGRAM, THIS STUDY USED THE SEMANTIC DIFFERENTIAL TECHNIQUE TO IDENTIFY RELATIONSHIPS BETWEEN CONTENT AND ASSIMILATION IN A LEARNING SITUATION. BEFORE AND AFTER THE PROGRAM, 41 SUPERVISORS RATED 12 CONCEPTS ON A CONTINUUM BETWEEN POLAR OPPOSITES. THE CONCEPTS REPRESENTED SUCH BASIC IDEAS OR CONDITIONS IN THE PROGRAM AS TEACH, AWARE, EXAMINE, SELF, WARM, AND INEPT. THE SCALES COVERED THE THREE MAJOR FACTORS OF EVALUATION, POTENCY, AND ACTIVITY. AN INTERCORRELATION MATRIX WAS USED TO DETERMINE THE DEGREE OF RELATEDNESS BETWEEN SCALES. IT WAS CONCLUDED THAT--(1) CHANGES DID TAKE PLACE IN THE PARTICIPANT'S ATTITUDE TOWARD THE PROGRAM AND THE NEGATIVE ATTITUDES WERE MORE AMENABLE TO CHANGE THAN THE POSITIVE, (2) THE DIRECTION OF CHANGE WAS FROM EXTREMES OF POLARITIES TO A NEUTRAL POSITION, AND (3) THE EVALUATION FACTOR WAS THE MOST SENSITIVE INDICATOR OF CHANGE. THIS DOCUMENT APPEARED IN TRAINING AND DEVELOPMENT JOURNAL, VOLUME 21, NUMBER 11, NOVEMBER 1967 AND WAS PRESENTED AS A PAPER AT THE NATIONAL SEMINAR ON ADULT EDUCATION RESEARCH, CHICAGO, FEBRUARY 11-13, 1968. (PT)

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An Objective Evaluation of Attitude Change in Training

A Before and After Study of 12 Stimuli in a Supervisory Program

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Aurelius A. Abbatiello

Better than a year ago, a planning conference under the aegis of the training department of a large Midwest communications equipment manufacturer found itself in the difficult position of having to shorten its supervisory development training program. The discussion that ensued found the members divided along singular lines. It split the group into two factions: those in favor of deleting certain topics in the program, and others in favor of deleting only some content of various topics in the program. In either case, neither faction seemed to give credence to the goals of the program, and so, the problem appeared in bold relief. Are the goals of the program satisfied? Do changes occur in the participants consistent with these goals? Is the change informational? Attitudinal? If attitudinal, to what degree do changes occur? How?

The possibility of measuring attitudinal change, to which this study has been addressed, is problematic at best. To answer by how much is even more so and requires an unusually sensitive technique to intrapersonal dynamics. The content of the program is the only stable aspect and represents the stimulus which prompts change. It places a high premium on semantics.

Purpose

The purpose of the study was to de-

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termine whether changes in attitudes occurred as a result of exposure to and participation in a training program for the development of supervisory talent. The members of the planning conference could agree on little else. They were split in their opinion of the content as to the assortment and extant of the topics. There was general disagreement on the very goals of the program. The only point of agreement was a consensus that the participant change from worker to supervisor in his outlook.

Instrument Development

A check of the literature showed few psychological techniques which even claimed to tap the conceptual content in such learning situations. Fewer still were capable of identifying relationships between that content and assimilation. Only one technique, the Semantic Differential (Osgood, Suci, and Tannenbaum, 1957), gave promise of doing both. The instrument developed for this signal purpose and based on this technique, subsequently designated as the S-D Inventory, is a word association test of a semi-structured nature. It attempts to measure the "meaning" underlying an appreciation of a concept in relation to secondary attributes. It requires the subject to rate on a graphic scale a given concept. Polar opposites set off the continuum. Intervals along this continuum yield values that may be assigned to attributes of the concept in question. The sum of these values will quantify the meaning of the concept and hopefully spell out the significance of the concept. (See Figure 1.)

Twelve concepts were selected as stimuli. Each represents a basic idea or condition current in the program. Categorically, they fall into an assortment that contains all the essentials required for evaluation. (See Table I.) Members of the training staff contributed these concepts when asked for a list of prevalent ideas conveyed by course content and/or participant behavior. While the original list did not contain the exact number of concepts used, a sifting of their contributions with the aid of Roget's Thesaurus netted twelve reasonable distinct stimuli.

Table I

Categorical Groupings of Stimuli

Conditions			
Active	*Passive*	*Ends*	*Judgments*
ask	aware	group	dull
examine	balance	self	useful
teach	inept	word	warm

The concepts were compared on ten scales derived from factor studies (Cf. Osgood, Suci and Tannenbaum, 1957). These scales cover the three major factors of evaluation, potency and activity. The evaluative factor is representative of "various" modes of evaluation. The scales assigned to this factor are good-bad and fresh-stale. The nature of the potency factor is apparent in the scales used, weak-strong, rough-smooth, and small-large. The activity

Figure 1. Rating of Teach in One Dimension

Teach

good__x__ : ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

ficiently similar to obviate the possibility of having been drawn from other than the same population. Because the subjects of each group respond in a similar manner seems to argue eloquently for the merits of the technique used as well as the singularity of the sample.

Figure 2. Initial Survey at Program's Inception

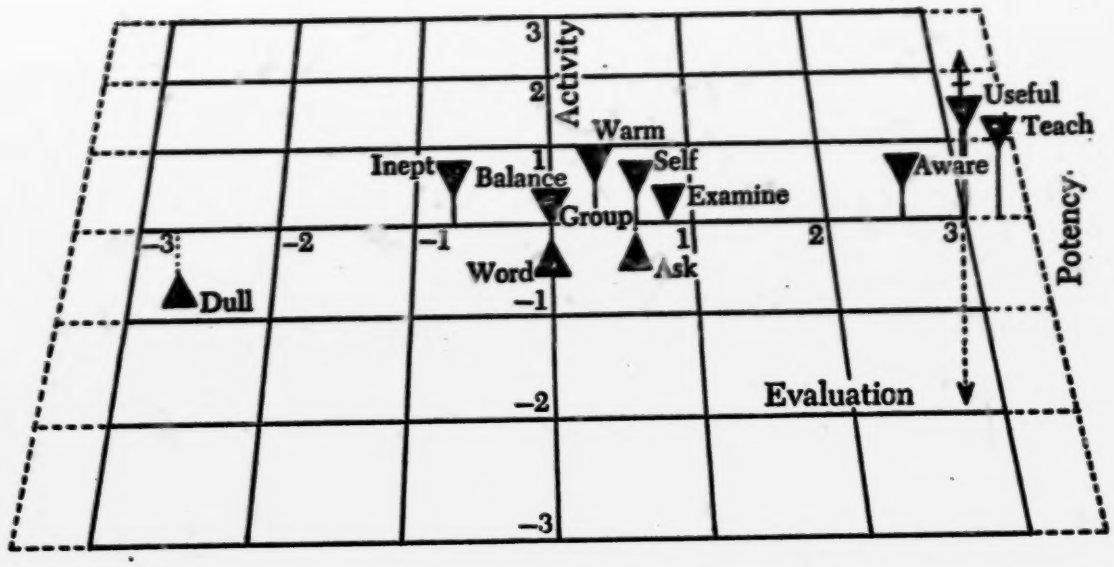
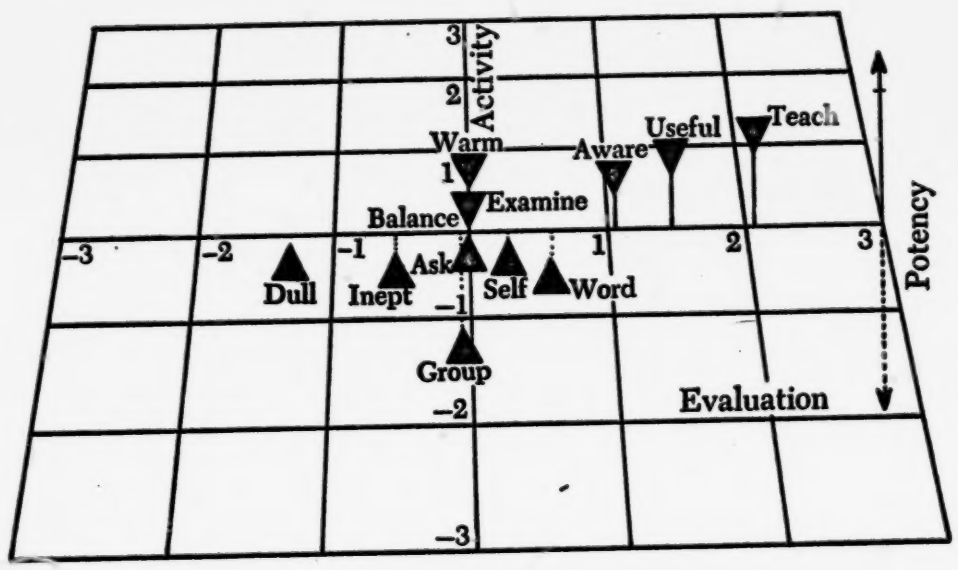


Figure 3. Subsequent Survey at Program's Conclusion



Inspection of the concept profiles offers a detailed picture of each concept as defined by every scale in terms of direction and intensity. Also apparent are the changes that have taken place over time in the course of indoctrination. The direction of change for most concepts has been from the extremes toward a neutral position. The change seems consistent by way of the design of this training program. Diagrammatic projections appear in Figures 2 and 3 for the purpose of illustrating the relationships among and between concepts as they are fixed in semantic space.

Each stimulus-concept is defined by a set of ten dimensions. Not all are equally relevant, definitive nor appropriate, and, as a consequence, not equally provocative. Those dimensions considered inappropriate by the trainees do not reflect intensity or movement. There is obvious concurrence of opinion, however, on the stimuli *teach, aware,* and *useful.* Each has been found to be best defined by five of the matrix dimensions: *teach* is strong, active, good, and fresh; *aware* is strong, good, and fresh; *useful* is strong, smooth, active, good, and fresh. In the case of each concept, the direction of change over the period of indoctrination is toward less definiteness.

The neutral concepts to emerge were: *example, ask, balance, word,* and *self.* No significant change in these concepts took place over time. The concept, *warm* might also be considered as neutral since it showed change in only those dimensions, i.e., cold-hot and wet-dry, that are logically pertinent. The concept *group* being defined as strong and rounded follows much the same pattern.

The negative concepts *inept* and *dull* proved to be more provocative. Both concepts duplicate a degree of intensity found in the profiles of the more positive concepts, *teach, aware,* and *useful.* The concept *inept* changes on the dimension of rough-smooth only, *dull* changes on two dimensions, rough-smooth and good-bad.

Discussion

The preceding detailed explanation fixes the concepts, the direction of change which takes place during the course of member participation in the program, and little else. Reflection as to dimensions and direction of change yields clues as to their relative significance. The significance of these changes may now be considered in terms of the initial assumption that whatever changes take place are a function of participation.

As previously noted, the direction of change has been toward a neutral position. Its significance seems obvious and may best be explained by a consideration of the demands made upon the trainees during participation. Each man is introduced into a conference-type study group. He approaches the program with an experimental acumen unique to his own environment. The study group atmosphere is relatively permissive, alien to that of his own work situation and is capable of generating anxiety as a consequence. The group leader, a program staff member, exploits the permissive atmosphere more thoroughly than the more directive to which the trainee is accustomed. He assumes a peer role and develops his subject matter with a "group-centered" technique.

Results of the initial survey administration indicate that the experimental acumen of incoming trainees is quite expansive. The participants tend to express a popular stereotyped set to the conceptual content of the inventory. However, the results of the follow-up test administration indicate a trend toward a more constricted approach to those concepts amenable to change. Whether this is an indication

of a personality in the throes of change or in a compromising position is open to conjecture. More probably, he has become more introspective and less anxious due to the following seemingly unrelated factors:

1. A familiarity with the course content and environs;
2. A reduction of stress and ego-threat;
3. A restructuring of conceptual patterns (hopefully, along more lucid lines); and,
4. A re-evaluation of his projected role as supervisor.

The concept *teach* shows a significant change taking place in four of the dimension scales which represent each of the factor loadings of evaluation, activity, and potency. Experimental acumen in authoritarian-academic settings may account for the designation of the concept as positive on the active-passive dimension. The connotation is that of an active process. The tenor of the indoctrination program undoubtedly accounts for the change here since the "client-centered" approach seems to de-emphasize the "active" aspect of *teach*.

The change from a neutral position in the fresh-stale dimension to a rather "stale" concept is also noteworthy. This change would seem to represent a moral judgment on the part of the participants, i.e., a dissatisfaction with the presentation for reasons bred of familiarity with the immediate environment, of opposition to the manner of presentation, and/or of contrast to other concepts on a connotative basis. The concept *aware* shows deviations in only two of the four dimensions noted. Both are evaluative in nature and change takes place in that direction alone. The concept *useful* also resembles that of *teach* on the dimension good-bad. The potency factor illustrated by the dimension rough-smooth moves from a more positive to a neutral position, characteristic of the concepts *teach* and *aware*.

The concepts *examine*, *balance* and *word* share no significant change over the period of participation in the program. An explanation seems to lie in the assumption that these concepts are static, inappropriate to the investigation and/or not amenable to change in this context. Projected into semantic space they prove to be of even greater interest. Each of the concepts falls on an orthogonal coordinate and as such has no valence. Further, while they change positions slightly on the evaluation and potency factors scales, they do not on the activity factor scales.

The core concept of self by its very nature might not be expected to change. It lends continuity to conscious activity, referring to the phenomenal self. The concept *warm*, although not of a neutral order, was not amenable to conditioning. It is fixed on the continuum hot-cold and wet-dry; its accidental nature objectifies the concept, thus lending little in the way of flexibility. The concept *ask* assumes the proportions of more neutral concepts like *examine*, *balance* and *word*.

Group seems to serve as a primary core concept resembling *self* but referring instead to outgroup relationships. Beyond this function, *group* fixes the semantic distance between itself and the phenomenal self. The profile shows a high degree of similarity between *group* and *self* on all but two dimensions, angular-rounded and weak-strong. Logic seems to support the greater appropriateness of these dimensions for the concept *group* over *self*. The lack of intensity and direction of *group* in the initial administration indicates a certain propensity among trainees to regard the concept as a pivot point about which participation develops. A breakdown of this

phenomenon in the potency factor occurs in the later administration.

Inept and *dull* are negative concepts but not similar in makeup nor by definition. *Inept* is defined as rough, cold, bad and tense. Change takes place in one dimension only, rough-smooth. As with so many of the other concepts, this concept becomes less definite on completion of the program. *Dull* is defined as weak, rough, passive, bad and stale. Significant changes occur in two dimensions only, rough-smooth and good-bad. The similarity of these concepts on both the evaluation and potency factors scales is noteworthy. All ten dimensions of the scale matrix are not equally definitive. Nor would they be expected to be any more so than other concepts.

The concepts selected vary in terms of relevance to the content of the program. Each relates to personal experience in its own way. Since those concepts most closely related to *group* are common to more than the immediate experience with which we are dealing, the accompanying attitudes are not easily altered. To modify them would require more intense indoctrination. Those concepts lying at a distance from the core, *group*, should conversely be more amenable to change, whether negative or positive. While the implications of positive over negative concepts are not determinable except in context, the positive concepts seem to resist change more strongly than do negative concepts.

Projected Conceptual Model

The counterpart of localizing the concepts as fixed in semantic space is to fix the relationships of these same concepts in relation to the phenomenal self. Using a special application of the Mahalanobis generalized distance formula, it becomes possible to project distances between concepts. Essentially, it is their communality which fixes their relative positions. The space occupied is defined by the common dimensions used. These dimensions serve as axes which when placed in a mutually orthogonal position intersect at the concept *self*. (See Figure 4.)

This isometric projection is predicated on an m x m distance matrix. *Self* is the 0 point. Beyond this point each succeeding concept is fixed by the intersecting of interconcept distances.

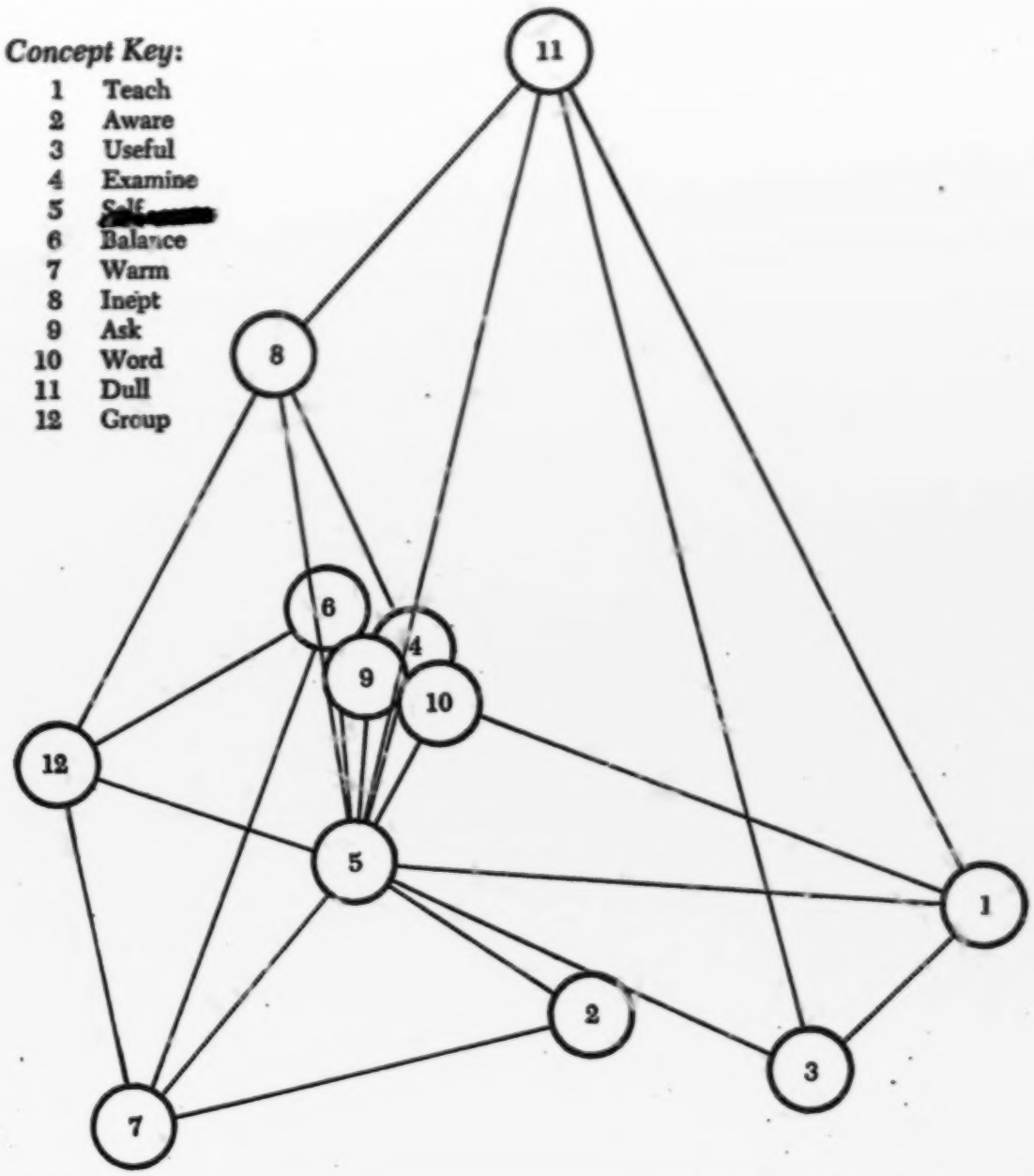
Conclusions

The problem of this study has been to determine whether significant psychological changes occur as a result of participation in an industrial supervisory practices training program. The importance of this research lies in both its scientific contribution and practical applications. Conclusions drawn from this study allow the reader to understand the level at which participation takes place, the strength of attitudes toward program content, and the appropriateness of the material presented.

What was conceived originally as a single project has now broadened into two areas of concern, i.e., the nature of concept change over time and the development of an instrument capable of measuring that change. The rationale for this research did not distinguish this measurement of the phenomenon from the instrument itself. Therefore, the conclusions about the makeup of the instrument, the structural content, the stimuli and scales are all bound to the content of the program.

Statistical techniques have been used to determine the merit of the structural content, the provocativeness of each stimulus and the polarity of each scale. The stimuli describe the program content. The scale dimensions describe the projections in se-

Figure 4. Conceptual Model Based on m x m D Matrix



mantic space of those stimuli. Changes that occur with participation in the program become a function of the interlocking components of the instrument with varying degrees of success.

Bearing in mind the intricate interrelationships among these components, the following conclusions might be drawn:

1. Changes in attitudes do take place in the participant toward program content. Those that are negative are more amenable to change than are positive attitudes.
2. The direction of these changes are from polarity toward a distinctly neutral position. The logic for such changes may be interpreted in

terms of program objectives and orientation.

3. Of the three factor loadings used, the evaluation factor is the most sensitive indicator of change. Stimuli plotted on this dimension show the greatest change over the period of program participation. The remaining two factors, activity and potency, are reliable in that order of appearance.

These conclusions become all the more compelling in the cold light of logic. Changes would be expected to appear whenever anyone participates in a learning experience. These changes, of course, will be peculiar to the population sampled, to the material to which the participants are exposed, and to the training methods used in the program. The amount or direction of change is limited by these peculiarities.

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